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EXAMINER

HON, SOW FUN

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/532,059	Applicant(s) HIRAI ET AL.	
	Examiner SOPHIE HON	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,12-15 and 17-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-10,12-15 and 17-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/04/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Withdrawn Rejections

1. The 35 U.S.C. 112, 2nd paragraph rejection of claims 1-3, 17-22 is withdrawn due to Applicant's amendment dated 1/04/08.
2. The 35 U.S.C. 102(b) and 103(a) rejections of claims 1-3, 8-12, 17-22 over Land as the primary reference, are withdrawn due to Applicant's cancellation of claim 2 and Applicant's amendment dated 1/04/08.
3. The 35 U.S.C. 102(e) and 103(a) rejections of claims 4-11, 13-16 over Hikmet as the primary reference, are withdrawn due to Applicant's cancellation of claims 11, 16 and Applicant's amendment dated 1/04/08.

New Rejections

Claim Rejections - 35 USC § 112

4. Claims 12-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 11, upon which claims 12-15 depend, is cancelled. Correction is required. For the purposes of examination, said claims will be treated as though they depend on claim 8.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Art Unit: 1794

5. Claims 1, 8-10, 12, 17-18, 26, 28 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Land (US 2,454,515), as evidenced by Thomas (US 3,281,344).

Regarding claim 1, Land teaches a polarizer composed of a film comprising a structure in which fine metallic particles (finely divided polarizing agent, column 10, lines 69-71, colloidal asymmetric metal, column 11, lines 10-13) are dispersed in a polymer matrix (column 10, lines 13-72), where the polymer forming the polymer matrix is a cellulose acetate (column 2, lines 46-49) that is disclosed by Applicant as being one of the translucent polymers having a light transmittance within the range of 88% or more when measured thereof with a thickness of 1 mm (cellulose-based resin, page 17, first paragraph). Land teaches that a domain is formed with fine metallic particles after the film is immersed in a metallic salt solution, and the metallic salt is then converted to metallic particles (reduction of the salt, column 7, lines 47-52), wherein the film is stretched only after conversion of the metallic salt to fine metallic particles (reducing the salt to a metal and stretching the sheet, column 7, lines 47-52). Thus the anisotropy of the metallic particles during conversion is minimized. The presence of the polymer matrix prevents the metallic particles from agglomerating to form larger particles, so that the metallic particles in the polymer matrix of Land inherently have an average particle diameter within the claimed range of 100 nm or less and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less, as evidenced by Thomas.

Thomas teaches that when a polymer matrix is immersed in a dilute solution containing metal salt (decomposition of an iron-organic compound in the presence of an inert solvent and a polymer of at least 10,000 molecular weight, column 1, lines 55-60), the polymer matrix

Art Unit: 1794

prevents the metallic particles formed in situ, from agglomerating to form larger particles (column 2, lines 32-37) so that the metallic particles have an average particle diameter within the claimed range of 100 nm or less (100 to 1000 Å, column 1, lines 65-70) and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less (particles which are not spherical have a ratio of a longer edge to the shorter edge of not greater than 1.5, column 2, lines 13-16).

Regarding claim 8, Land teaches a polarizer composed of a film in which fine metallic particles (finely divided polarizing agent, column 10, lines 69-71, colloidal asymmetric metal, column 11, lines 10-13) are dispersed in an organic matrix (column 10, lines 13-72), having a birefringence in the film plane (plane polarizing film, oriented with the long axis of the particles in substantial parallelism with the direction in which said polymer is oriented, column 10, lines 67-74). Land teaches that a domain is formed with fine metallic particles after the film is immersed in a metallic salt solution, and the metallic salt is then converted to metallic particles (reduction of the salt, column 7, lines 47-52), wherein the film is stretched only after conversion of the metallic salt to fine metallic particles (reducing the salt to a metal and stretching the sheet, column 7, lines 47-52). Thus the anisotropy of the metallic particles during conversion is minimized. The presence of the polymer matrix prevents the metallic particles from agglomerating to form larger particles, so that the metallic particles in the polymer matrix of Land inherently have an average particle diameter within the claimed range of 100 nm or less and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less, as evidenced by Thomas.

Thomas teaches that when a polymer matrix is immersed in a dilute solution containing metal salt (decomposition of an iron-organic compound in the presence of an inert solvent and a polymer of at least 10,000 molecular weight, column 1, lines 55-60), the polymer matrix prevents the metallic particles formed in situ, from agglomerating to form larger particles (column 2, lines 32-37) so that the metallic particles have an average particle diameter within the claimed range of 100 nm or less (100 to 1000 Å, column 1, lines 65-70) and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less (particles which are not spherical have a ratio of a longer edge to the shorter edge of not greater than 1.5, column 2, lines 13-16).

Thus, although Land fails to disclose that the polarizer has an absorption spectrum with an absorption peak at a given wavelength, measured when a polarized light is incident thereon, wherein if an azimuth of an incident polarization plane is altered relative to the polarizer, the absorption peak wavelength shifts in accordance with an alteration in the azimuth, these properties are presumed to be inherent since Land teaches the claimed polarizer, as described above. Where the claimed and prior art products are identical or substantially identical in structure and composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, and the claimed properties are presumed to be inherent. See MPEP 2112.01. If there were to be any differences in structure or chemistry, these differences are presumed to be minor and obvious in the absence of evidence to the contrary.

Regarding claims 9-10, Land teaches a polarizer composed of a film in which fine metallic particles (finely divided polarizing agent, column 10, lines 69-71, colloidal asymmetric

Art Unit: 1794

metal, column 11, lines 10-13) are dispersed in an organic matrix (column 10, lines 13-72), having a birefringence in the film plane (plane polarizing film, oriented with the long axis of the particles in substantial parallelism with the direction in which said polymer is oriented, column 10, lines 67-74), wherein the organic matrix is formed with a polymer matrix (column 10, lines 13-72), a polymer forming the polymer matrix is a cellulose acetate (column 2, lines 46-49) that is disclosed by Applicant as being one of the translucent polymers having a light transmittance within the range of 88% or more when measured thereof with a thickness of 1 mm (cellulose-based resin, page 17, first paragraph), and the film is uniaxially stretched (column 2, lines 45-55, uniaxial, column 3, lines 38-42). Land teaches that a domain is formed with fine metallic particles after the film is immersed in a metallic salt solution, and the metallic salt is then converted to metallic particles (reduction of the salt, column 7, lines 47-52), wherein the film is stretched only after conversion of the metallic salt to fine metallic particles (reducing the salt to a metal and stretching the sheet, column 7, lines 47-52). Thus the anisotropy of the metallic particles during conversion is minimized. The presence of the polymer matrix prevents the metallic particles from agglomerating to form larger particles, so that the metallic particles in the polymer matrix of Land inherently have an average particle diameter within the claimed range of 100 nm or less and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less, as evidenced by Thomas.

Thomas teaches that when a polymer matrix is immersed in a dilute solution containing metal salt (decomposition of an iron-organic compound in the presence of an inert solvent and a polymer of at least 10,000 molecular weight, column 1, lines 55-60), the polymer matrix prevents the metallic particles formed in situ, from agglomerating to form larger particles

Art Unit: 1794

(column 2, lines 32-37) so that the metallic particles have an average particle diameter within the claimed range of 100 nm or less (100 to 1000 Å, column 1, lines 65-70) and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less (particles which are not spherical have a ratio of a longer edge to the shorter edge of not greater than 1.5, column 2, lines 13-16).

Thus, although Land fails to disclose that the polarizer has an absorption spectrum with an absorption peak at a given wavelength, measured when a polarized light is incident thereon, wherein if an azimuth of an incident polarization plane is altered relative to the polarizer, the absorption peak wavelength shifts in accordance with an alteration in the azimuth; or more specifically, that if an azimuth of the incident polarization plane is 0 degrees when an absorption peak wavelength of an absorption spectrum that is measured is the longest wavelength, defined as λ_1 , when the azimuth is gradually increased from 0 degrees, a value of the absorption peak wavelength shifts to the short wavelength side in accordance with the increase and when the azimuth is 90 degrees, a value of the absorption peak is the shortest wavelength, defined as λ_2 , satisfying a relation of $(\lambda_1 - \lambda_2) = 10$ to 50 nm, these properties are presumed to be inherent since Land teaches the claimed polarizer, as described above. Where the claimed and prior art products are identical or substantially identical in structure and composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, and the claimed properties are presumed to be inherent. See MPEP 2112.01. If there were to be any differences in structure or chemistry, these differences are presumed to be minor and obvious in the absence of evidence to the contrary.

Art Unit: 1794

Regarding claim 12, Land teaches that the organic matrix is formed with a polymer matrix (column 10, lines 13-72), wherein a polymer forming the polymer matrix is a cellulose acetate (column 2, lines 46-49) that is disclosed by Applicant as being one of the translucent polymers having a light transmittance within the range of 88% or more when measured thereof with a thickness of 1 mm (cellulose-based resin, page 17, first paragraph), and the film is uniaxially stretched (column 2, lines 45-55, uniaxial, column 3, lines 38-42).

Regarding claims 17-18, Land teaches a polarizing plate, which is an optical film, in which a transparent protective layer is provided on at least one surface of the polarizer (to protect from contact with moisture by laminating it between plastic sheets, column 4, lines 49-52).

Regarding claims 26, 28, Thomas teaches that the metal particles formed as described above, can be spherical (column 1, lines 64-66) for the special case of an aspect ratio (of a maximum length/a minimum length) of 1, which means that the spherical fine metallic particles are not aligned with the polymer matrix in the sense that a sphere only has one length.

6. Claims 4-6, 8-10, 13-15, 27-28 are rejected under 35 U.S.C. 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hikmet (US 6,833,166), as evidenced by Thomas (US 3,281,344).

Regarding claim 4, Hikmet teaches a polarizer (column 5, line 67) in which fine metallic particles (free metal particles, column 5, lines 13-16, nanometer size, column 1, line 15) are dispersed in a matrix formed with a liquid crystalline material (acrylates C5A and C6M, column 5, lines 25-28, C5A and C6M, column 2, lines 17-27, Fig. 1). Hikmet teaches that a domain is formed with fine metallic particles, when the organic matrix is immersed in a dilute solution containing metal salt (3 wt.%, column 5, lines 49-55) and the metal salt is converted to insoluble

Art Unit: 1794

free metallic particles (column 3, lines 50-51) which are of nanometer size small enough to be quantum dots (column 1, lines 14-20). The presence of the organic matrix prevents the insoluble free metallic particles from agglomerating to form larger particles, so that the free metallic particles in the organic matrix of Hikmet inherently have an average particle diameter within the claimed range of 100 nm or less and an aspect ratio within the claimed range of 2 or less, as evidenced by Thomas.

Thomas teaches that when a polymer matrix is immersed in a dilute solution containing metal salt (decomposition of an iron-organic compound in the presence of an inert solvent and a polymer of at least 10,000 molecular weight, column 1, lines 55-60), the polymer matrix prevents the metallic particles formed in situ, from agglomerating to form larger particles (column 2, lines 32-37) so that the metallic particles have an average particle diameter within the claimed range of 100 nm or less (100 to 1000 Å, column 1, lines 65-70) and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less (particles which are not spherical have a ratio of a longer edge to the shorter edge of not greater than 1.5, column 2, lines 13-16).

Regarding claim 5, Hikmet teaches that the liquid crystalline material is uniaxially aligned (uniaxial orientation of the molecules induced, column 5, lines 25-30).

Regarding claim 6, Hikmet teaches that the liquid crystalline material is a liquid crystal polymer (polymerized film, column 5, lines 45-50).

Regarding claim 8, Hikmet teaches a polarizer (column 5, line 67) composed of a film (polymerized film, column 5, lines 45-50) in which fine metallic particles (free metal particles, column 5, lines 13-16, nanometer size, column 1, line 15) are dispersed in an organic matrix

Art Unit: 1794

having a birefringence in the film plane (in a mixture containing 10 wt.% of diacrylate C6M, the high birefringence is sustained upon polymerization, column 2, lines 55-57, acrylates C5A and C6M, column 5, lines 25-28). Hikmet teaches that a domain is formed with fine metallic particles, when the organic matrix is immersed in a dilute solution containing metal salt (3 wt.%, column 5, lines 49-55) and the metal salt is converted to insoluble free metallic particles (column 3, lines 50-51) which are of nanometer size small enough to be quantum dots (column 1, lines 14-20). The presence of the organic matrix prevents the insoluble free metallic particles from agglomerating to form larger particles, so that the free metallic particles in the organic matrix of Hikmet inherently have an average particle diameter within the claimed range of 100 nm or less and an aspect ratio within the claimed range of 2 or less, as evidenced by Thomas.

Thomas teaches that when a polymer matrix is immersed in a dilute solution containing metal salt (decomposition of an iron-organic compound in the presence of an inert solvent and a polymer of at least 10,000 molecular weight, column 1, lines 55-60), the polymer matrix prevents the metallic particles formed in situ, from agglomerating to form larger particles (column 2, lines 32-37) so that the metallic particles have an average particle diameter within the claimed range of 100 nm or less (100 to 1000 Å, column 1, lines 65-70) and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less (particles which are not spherical have a ratio of a longer edge to the shorter edge of not greater than 1.5, column 2, lines 13-16).

Thus, although Hikmet fails to disclose that the polarizer has an absorption spectrum with an absorption peak at a given wavelength, measured when a polarized light is incident thereon, wherein if an azimuth of an incident polarization plane is altered relative to the polarizer, the

Art Unit: 1794

absorption peak wavelength shifts in accordance with an alteration in the azimuth, these properties are presumed to be inherent since Land teaches the claimed polarizer, as described above. Where the claimed and prior art products are identical or substantially identical in structure and composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, and the claimed properties are presumed to be inherent. See MPEP 2112.01. If there were to be any differences in structure or chemistry, these differences are presumed to be minor and obvious in the absence of evidence to the contrary.

Regarding claims 9-10, Hikmet teaches a polarizer (column 5, line 67) composed of a film (polymerized film, column 5, lines 45-50) in which fine metallic particles (free metal particles, column 5, lines 13-16, nanometer size, column 1, line 15) are dispersed in an organic matrix having a birefringence in the film plane (in a mixture containing 10 wt.% of diacrylate C6M, the high birefringence is sustained upon polymerization, column 2, lines 55-57, acrylates C5A and C6M, column 5, lines 25-28), wherein the organic matrix is formed with a liquid crystalline material (acrylates C5A and C6M, column 5, lines 25-28, C5A and C6M, column 2, lines 17-27, Fig. 1) which is a liquid crystal polymer (polymerized film, column 5, lines 45-50). Hikmet teaches that a domain is formed with fine metallic particles, when the organic matrix is immersed in a dilute solution containing metal salt (3 wt.%, column 5, lines 49-55) and the metal salt is converted to insoluble free metallic particles (column 3, lines 50-51) which are of nanometer size small enough to be quantum dots (column 1, lines 14-20). The presence of the organic matrix prevents the insoluble free metallic particles from agglomerating to form larger particles, so that the free metallic particles in the organic matrix of Hikmet inherently have an

Art Unit: 1794

average particle diameter within the claimed range of 100 nm or less and an aspect ratio within the claimed range of 2 or less, as evidenced by Thomas.

Thomas teaches that when a polymer matrix is immersed in a dilute solution containing metal salt (decomposition of an iron-organic compound in the presence of an inert solvent and a polymer of at least 10,000 molecular weight, column 1, lines 55-60), the polymer matrix prevents the metallic particles formed in situ, from agglomerating to form larger particles (column 2, lines 32-37) so that the metallic particles have an average particle diameter within the claimed range of 100 nm or less (100 to 1000 Å, column 1, lines 65-70) and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less (particles which are not spherical have a ratio of a longer edge to the shorter edge of not greater than 1.5, column 2, lines 13-16).

Thus, although Hikmet fails to disclose that the polarizer has an absorption spectrum with an absorption peak at a given wavelength, measured when a polarized light is incident thereon, wherein if an azimuth of an incident polarization plane is altered relative to the polarizer, the absorption peak wavelength shifts in accordance with an alteration in the azimuth; or more specifically, that if an azimuth of the incident polarization plane is 0 degrees when an absorption peak wavelength of an absorption spectrum that is measured is the longest wavelength, defined as λ_1 , when the azimuth is gradually increased from 0 degrees, a value of the absorption peak wavelength shifts to the short wavelength side in accordance with the increase and when the azimuth is 90 degrees, a value of the absorption peak is the shortest wavelength, defined as λ_2 , satisfying a relation of $(\lambda_1 - \lambda_2) = 10$ to 50 nm, these properties are presumed to be inherent since Hikmet, as evidenced by Thomas, teaches the claimed polarizer as described above.

Art Unit: 1794

Furthermore, Hikmet teaches that the organic matrix is synthesized from liquid crystalline monomers which have at least one acryloyl group and a nematic liquid crystal phase (acrylates C5A and C6M, column 5, lines 25-28, C5A and C6M, column 2, lines 25-27, Fig. 1), which are the same as or contain the same functional characteristics as the liquid crystal monomer having one acryloyl group and a nematic liquid crystal phase that is disclosed by Applicant (Example 3, specification, page 56, lines 15-20). Where the claimed and prior art products are identical or substantially identical in structure and composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, and the claimed properties are presumed to be inherent. See MPEP 2112.01. If there were to be any differences in structure or chemistry, these differences are presumed to be minor and obvious in the absence of evidence to the contrary.

Regarding claim 13, Hikmet teaches that the organic matrix is formed with a liquid crystalline material (acrylates C5A and C6M, column 5, lines 25-28, C5A and C6M, column 2, lines 17-27, Fig. 1).

Regarding claim 14, Hikmet teaches that the liquid crystalline material is uniaxially aligned (uniaxial orientation of the molecules induced, column 5, lines 25-30).

Regarding claim 15, Hikmet teaches that the liquid crystalline material is a liquid crystal polymer (polymerized film, column 5, lines 45-50).

Regarding claims 27-28, Thomas teaches that the metal particles formed as described above, can be spherical (column 1, lines 64-66) for the special case of an aspect ratio (of a maximum length/a minimum length) of 1, which means that the spherical fine metallic particles are not aligned with the polymer matrix in the sense that a sphere only has one length.

Claim Rejections - 35 USC § 103

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Land, as evidenced by Thomas, as applied to claims 1, 8-10, 12, 17-18, 26, 28 above.

Land teaches the polarizer film product comprising a structure in which fine metallic particles are dispersed in a polymer matrix, wherein a polymer forming the polymer matrix is a translucent polymer having a light transmittance of 88% or more when measured thereof with a thickness of 1 mm and the film is uniaxially stretched, as described above, which means that there is a fabrication method for the polarizer film product. Land teaches the step of uniaxially stretching the film after the step of forming the film (column 2, lines 45-55, uniaxial, column 3, lines 38-42). Land fails to teach the step of forming a film with a mixed solution obtained by dispersing fine metal particles in a solution containing a translucent polymer having a light transmittance of 88% or more when measured thereof with a thickness of 1 mm.

However, the generic step of forming a film from a mixed solution obtained by dispersing particles in a solution containing the matrix material is a step that is notoriously well known to one of ordinary skill in the art, used for the purpose of forming very thin film composites.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a step of forming a film with a mixed solution obtained by dispersing the fine metal particles in a solution containing the translucent polymer, in the

Art Unit: 1794

fabrication method for the polarizer film of Land, in order to form a very thin film polarizer composite, as is well known in the art.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hikmet, as evidenced by Thomas, as applied to claims 4-6, 8-10, 13-15, 27-28 above.

Hikmet teaches the polarizer film product in which the fine metal particles are dispersed in a matrix formed with the liquid crystalline material, as described above, which means that there is a fabrication method for the polarizer film product. Hikmet fails to teach a fabrication method of forming the polarizer that comprises the step of forming a film with a mixed solution obtained by dispersing fine metal particles in a solution containing liquid crystalline material.

However, the generic step of forming a film from a mixed solution obtained by dispersing particles in a solution containing the matrix material is a step that is notoriously well known to one of ordinary skill in the art, used for the purpose of forming very thin film composites.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a step of forming a film with a mixed solution obtained by dispersing the fine metal particles in a solution containing the liquid crystalline material, in the fabrication method for the polarizer film of Hikmet, in order to form a very thin film polarizer composite, as is well known in the art.

9. Claims 19-23, 25, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Land, as evidenced by Thomas, as applied to claims 1, 8-10, 12, 17-18, 26, 28 above, and further in view of Oshima (US 4,268,127).

Land teaches the polarizing plate optical film in which a transparent protective layer is provided on at least one surface of the polarizer film comprising a structure in which fine metallic particles are dispersed in a polymer matrix, wherein a polymer forming the polymer matrix is a translucent polymer having a light transmittance of 88% or more when measured thereof with a thickness of 1 mm and the film is uniaxially stretched, as described above.

Regarding claims 19-22, Land fails to teach the polarizing plate as a laminate in an optical film with an additional function, or that the polarizing plate optical film containing the polarizer is disposed in an image display.

However, Oshima teaches that when a polarizing plate containing a polarizer is disposed in an image display (polarizer, column 1, lines 7-18), a light diffusing layer is laminated to the polarizing plate (a semi-transparent resin layer 101 composed of a polyester film 111 and light diffusing material 13 is bonded to polarizing layer 103 via adhesive layer, polarizing layer 103 composed of a polarizer element 131 and a protective coating 132, column 5, lines 35-47), for the purpose of providing the desired uniform polarized light (column 1, lines 55-57).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have laminated the polarizing plate of Land with a diffusing layer, and to have disposed the laminate in an image display, in order to provide the image display with the desired uniform polarized light, as taught by Oshima.

Regarding claims 23, 25, Land is silent regarding the content and hence amount of the fine metallic particles dispersed in the matrix.

However, Land teaches that the fine metallic particles provide the desired polarization of light (column 2, lines 5-10) while teaching that the polarizer transmits more than 75% of the

Art Unit: 1794

polarized light (of one component of the incident beam, column 4, lines 1-5). This means that the content and hence amount of fine metallic particles dispersed in the matrix has to be within a certain range for the purpose of providing the desired balance of light polarization and polarized light transmission.

Oshima teaches that a content of fine metallic particles (metal powder, column 2, lines 65-68, particle diameter about $0.01 \mu = 10 \text{ nm}$, column 3, lines 2-6) of about 0.3 to 30 parts by weight relative to 100 parts by weight of the matrix materials (mixed into the synthetic resin, % by weight, column 3, lines 2-9), which overlaps the claimed range of 0.1 to 10 parts by weight, wherein the matrix materials are light transmissive (transparent synthetic resin, column 2, lines 63-65), provides a favorable polarizing efficiency (column 3, lines 5-15).

Therefore, since Land is silent regarding the content of fine metallic particles dispersed in the matrix, it would have been necessary and hence obvious to have looked to the prior art for suitable amounts. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided a content of fine metallic particles dispersed in the matrix of the polarizer of Land that is within the range of 0.1 to 10 parts by weight relative to 100 parts by weight of the matrix materials, in order to provide the desired balance of polarizing efficiency and polarized light transmission, as taught by Oshima.

10. Claims 12, 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hikmet, as evidenced by Thomas, as applied to claims 4-6, 8-10, 13-15, 27-28 above, and further in view of Oshima (US 4,268,127).

Hikmet teaches the polarizer in which fine metallic particles is dispersed in an organic matrix formed with a liquid crystalline materials, as described above.

Regarding claim 12, Hikmet teaches that the liquid crystalline material is uniaxially stretched (uniaxial orientation of the molecules induced, column 5, lines 25-30) and that the liquid crystalline material is a liquid crystal polymer (polymerized film, column 5, lines 45-50) which is translucent. Hikmet is silent regarding the amount of light transmittance of the translucent liquid crystal polymer when measured with a thickness of 1 mm.

However, Oshima teaches that the light transmittance of a translucent polymer that forms polarizing films (transparent or semi-transparent resin, column 62-65) is preferably within the range of at least 70% (column 2, lines 32-37), which contains the claimed range of 88% or more, for the purpose of providing the desired polarized light transmittance.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided a translucent liquid crystal polymer with a light transmittance that is within the range of 88% or more, as the translucent liquid crystal polymer in the polarizer of Hikmet, in order to obtain the desired polarized light transmittance, as taught by Oshima.

Regarding claims 24-25, Hikmet is silent regarding the content and hence amount of the fine metallic particles dispersed in the matrix.

However, Oshima teaches that a content of fine metallic particles (metal powder, column 2, lines 65-68, particle diameter about $0.01\ \mu = 10\ \text{nm}$, column 3, lines 2-6) of about 0.3 to 30 parts by weight relative to 100 parts by weight of the matrix materials (mixed into the synthetic resin, % by weight, column 3, lines 2-9), which overlaps the claimed range of 0.1 to 10 parts by weight, wherein the matrix materials are light transmissive (transparent synthetic resin, column 2, lines 63-65), provides a favorable polarizing efficiency (column 3, lines 5-15).

Therefore, since Hikmet is silent regarding the content of fine metallic particles dispersed in the matrix, it would have been necessary and hence obvious to have looked to the prior art for suitable amounts. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided a content of fine metallic particles dispersed in the matrix of the polarizer of Hikmet that is within the range of 0.1 to 10 parts by weight relative to 100 parts by weight of the matrix materials, in order to provide the desired polarizing efficiency, as taught by Oshima.

Response to Arguments

11. Applicant's arguments have been fully considered but they are not persuasive.
12. Applicant argues that Land describes that the metal particle is needle-like asymmetric in one embodiment (column 11, lines 11-13) [which is consistent] with the disclosure of fine metallic particles having a long axis and a short axis are dispersed in the polymer wherein the long axis of the fine particles is oriented in the orientation direction of the polymer, while the aspect ratio of 2 or less as required by Applicant's claim 1 is not derivable from the description of needle-like asymmetric metal.

Applicant is respectfully apprised that the metal particle can still be needle-like asymmetric, and still have an aspect ratio of 2 or less since the long axis having the maximum length of the particle is 2 or less times the minimum length of the short axis having the minimum length of the particle. Only the truly spherical particle which has an aspect ratio of 1 would not be derivable from the description of "needle-like" asymmetric metal. This is further evidenced

Art Unit: 1794

by US 5,489,496 which teaches that the term "needlelike" means a shape that has an aspect ratio of 1.5 or more (column 4, lines 35-40), which overlaps the claimed range of 2 or less.

Furthermore, Applicant is respectfully reminded that while Land teaches one embodiment where the particle is asymmetric needle-like, Land teaches in the body of the specification that the film is immersed in a metallic salt solution, and the metallic salt is then converted to metallic particles (reduction of the salt, column 7, lines 47-52), wherein the film is stretched only after conversion of the metallic salt to fine metallic particles (reducing the salt to a metal and stretching the sheet, column 7, lines 47-52). Thus the anisotropy of the metallic particles during conversion is minimized. The presence of the polymer matrix prevents the metallic particles from agglomerating to form larger particles, so that the metallic particles in the polymer matrix of Land inherently have an average particle diameter within the claimed range of 100 nm or less and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less, as evidenced by Thomas.

Thomas teaches that when a polymer matrix is immersed in a dilute solution containing metal salt (decomposition of an iron-organic compound in the presence of an inert solvent and a polymer of at least 10,000 molecular weight, column 1, lines 55-60), the polymer matrix prevents the metallic particles formed in situ, from agglomerating to form larger particles (column 2, lines 32-37) so that the metallic particles have an average particle diameter within the claimed range of 100 nm or less (100 to 1000 Å, column 1, lines 65-70) and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less (particles which are not spherical have a ratio of a longer edge to the shorter edge of not greater than 1.5, column

Art Unit: 1794

2, lines 13-16), wherein the metal particles can be spherical (column 1, lines 64-66) for the special case of an aspect ratio (of a maximum length/a minimum length) of 1.

13. Applicant argues that the particles of the polarizing agent of Land must be aligned.

Applicant is respectfully reminded that as discussed above, while Land teaches one embodiment that the particles of the polarizing agent are aligned, Land teaches in the body of the specification that the fine metallic particles are formed during conversion of the metal salt to free metal particles, which can be spherical, as evidenced by Thomas.

14. Applicant argues that Hikmet only describes forming a specific polymer compound which is chemically bound to metal atoms to form quantum dots, wherein only metal salts such as CdS binding to a polymer are disclosed and hence Hikmet fails to teach fine metallic particles dispersed [in the polymer matrix] to form the fine domain.

Applicant is respectfully apprised that Hikmet teaches that the quantum dots can be conductive metal particles (column 1, lines 15-30) which are free metal particles as opposed to water-insoluble salt (column 3, lines 55-62) such as CdS (column 3, lines 65-67).

15. Applicant argues that Hikmet does not disclose that the aspect ratio is 2 or less.

Applicant is respectfully reminded that the organic matrix is immersed in a dilute solution containing metal salt (3 wt.%, column 5, lines 49-55) and the metal salt is converted to insoluble free metallic particles (column 3, lines 50-51) which are of nanometer size small enough to be quantum dots (column 1, lines 14-20). The presence of the organic matrix prevents the insoluble free metallic particles from agglomerating to form larger particles, so that the free metallic particles in the organic matrix of Hikmet inherently have an average particle diameter

Art Unit: 1794

within the claimed range of 100 nm or less and an aspect ratio within the claimed range of 2 or less, as evidenced by Thomas.

Thomas teaches that when a polymer matrix is immersed in a dilute solution containing metal salt (decomposition of an iron-organic compound in the presence of an inert solvent and a polymer of at least 10,000 molecular weight, column 1, lines 55-60), the polymer matrix prevents the metallic particles formed in situ, from agglomerating to form larger particles (column 2, lines 32-37) so that the metallic particles have an average particle diameter within the claimed range of 100 nm or less (100 to 1000 Å, column 1, lines 65-70) and an aspect ratio (a ratio of maximum length/ minimum length) within the claimed range of 2 or less (particles which are not spherical have a ratio of a longer edge to the shorter edge of not greater than 1.5, column 2, lines 13-16) wherein the metal particles can be spherical (column 1, lines 64-66) for the special case of an aspect ratio (of a maximum length/a minimum length) of 1.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

Art Unit: 1794

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number is (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris, can be reached at (571)272-1478. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sophie Hon/
Sow-Fun Hon

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Group Art Unit 1794